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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ERDEM, FAZLI

ART UNIT PAPER NUMBER

2826

DATE MAILED: 05/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Applicati n No.

09/903,784

Applicant(s)

TUNGARE ET AL. 

Examiner

Fazli Erdem

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 55-90 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 55-90 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 55-62 rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer (5,478,653) in view of Sakurai et al. (2001/0055820 A1) further in view of Kizilyalli et al. (6,320,238) further in view of Takayama et al. (6,341,851) further in view of Yano et al. (5,985,404).

Regarding Claims 55-62, Guenzer discloses bismuth titanate as a template layer for growth of crystallographically oriented silicon where a method of forming a crystallographically oriented silicon layer over a glassy layer of silicon dioxide. A templating layer of a layered perovskite is deposited on the glassy layer under conditions favoring its crystallographic growth with its long c-axis perpendicular to the film. The silicon is then grown over the templating layer under conditions usually favoring monocrystalline growth. Guenzer fails to disclose the required single crystal perovskite structure, oxide interface structure, compound structure, and the piezoelectric with thickness structure. However, Sakurai et al. disclose a ferroelectric thin film device and method of producing the same where the required perovskite structure is disclosed. Furthermore, Kizilyalli et al. disclose a gate structure for integrated circuit fabrication where the required oxide interface structure is shown. Yano et al. disclose a recording medium method of making and information processing apparatus where the required compound structure is

Art Unit: 2826

disclosed. Finally, Takayama et al. disclose an ink jet recording apparatus including a pressure chamber and pressure applying means where the required piezoelectric structure with thickness is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required perovskite, interface, compound, and piezoelectric structures in Guenzer as taught by Sakurai et al., Kizilyalli et al., Yano et al., and Takayama et al. respectively in order to have a perovskite structure with better performance.

2. Claims 63-70 rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer (5,478,653) in view of Suzuki et al. (6,229,159) further in view of Lee et al. (2002/0179000) further in view of Kizilyalli et al. (6,320,238) further in view of Qiu et al. (6,419, 849) further in view of Takayama et al. (6,341,851) further in view of Swartz et al. (5,198,269).

Regarding Claims 63-70, Guenzer discloses bismuth titanate as a template layer for growth of crystallographically oriented silicon where a method of forming a crystallographically oriented silicon layer over a glassy layer of silicon dioxide. A templating layer of a layered perovskite is deposited on the glassy layer under conditions favoring its crystallographic growth with its long c-axis perpendicular to the film. The silicon is then grown over the templating layer under conditions usually favoring monocrystalline growth. Guenzer fails to disclose the required single crystal silicon in the required manner, perovskite structure, oxide interface structure, compound structure, and the piezoelectric with thickness structure. However, Suzuki et al. disclose a silicon based functional matrix substrate and optical integrated oxide device where the single crystal silicon structure is disclosed in the required manner. Furthermore, Lee et al.

Art Unit: 2826

disclose a method for single crystal growth of perovskite oxides where the required single crystal perovskite structure is shown. Kizilyalli and Qiu combination disclose the required interface oxide structure in the required manner. Takayama et al. and Swartz combination disclose the required compound/piezoelectric semiconductor structure and the thickness structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the required monocrystalline silicon in the required manner, monocrystalline perovskite structure, required oxide interface, required compound/piezoelectric structure in Guenzer as taught by Lee et al., Kizilyalli et al., Qiu et al., Takayama et al., and Swartz respectively in order to have a perovskite structure with better performance.

3. Claims 71-74 rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer (5,478,653) in view of Suzuki et al. (6,100,578) further in view of Sakurai (6,204,525) further in view of Kizilyalli et al. (6,320,238) further in view of Qiu et al. (6,419, 849) further in view of Takayama et al. (6,341,851) further in view of Swartz et al. (5,198,269).

Regarding Claims 71-74, Guenzer discloses bismuth titanate as a template layer for growth of crystallographically oriented silicon where a method of forming a crystallographically oriented silicon layer over a glassy layer of silicon dioxide. A templating layer of a layered perovskite is deposited on the glassy layer under conditions favoring its crystallographic growth with its long c-axis perpendicular to the film. The silicon is then grown over the templating layer under conditions usually favoring monocrystalline growth. Guenzer fails to disclose the required single crystal silicon in the required manner, perovskite structure, oxide interface structure, compound structure, and the piezoelectric with thickness structure. However, Suzuki et al.

Art Unit: 2826

disclose a silicon based functional matrix substrate and optical integrated oxide device where the single crystal silicon structure is disclosed in the required manner. Furthermore, Sakurai et al. disclose a ferroelectric thin film device and method of producing the same where the required perovskite structure is disclosed. Kizilyalli and Qiu combination disclose the required interface oxide structure in the required manner. Takayama et al. and Swartz combination disclose the required compound/piezoelectric semiconductor structure and the thickness structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the required monocrystalline silicon in the required manner, monocrystalline perovskite structure, required oxide interface, required compound/piezoelectric structure in Guenzer as taught by Sakurai et al., Kizilyalli et al., Qiu et al., Takayama et al., and Swartz respectively in order to have a perovskite structure with better performance.

4. Claims 75-81 rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer (5,556,463) in view of Wasa et al. (2002/0076875) further in view of Takayama et al. (6,341,851) further in view of Kizilyalli et al. (6,320,238) further in view of Qiu et al. (6,419,849) further in view of McKee et al. (5,830,270) further in view of Swartz et al. (5,198,269).

Regarding Claims 75-81, Guenzer discloses bismuth titanate as a template layer for growth of crystallographically oriented silicon where a method of forming a crystallographically oriented silicon layer over a glassy layer of silicon dioxide. A templateing layer of a layered perovskite is deposited on the glassy layer under conditions favoring its crystallographic growth with its long c-axis perpendicular to the film. The silicon is then grown over the templating layer under conditions usually favoring monocrystalline growth. Guenzer fails to disclose the required

Art Unit: 2826

method of making a single crystal silicon in the required manner, method of making perovskite structure, oxide interface structure, compound structure, and the piezoelectric with thickness structure. However, Wasa et al. disclose the method of making single crystal silicon structure. Furthermore, Takayama et al. disclose the method of making perovskite structure. Kizilyalli and Qiu combination disclose the required oxide interface structure. McKee discloses the required piezoelectric structure. Finally, Swartz discloses the required compound semiconductor structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the required method for monocrystalline silicon in the required manner, monocrystalline perovskite structure, required oxide interface, required compound/piezoelectric structure in Guenzer as taught by, Wasa et al., Takayama et al., Kizilyalli et al., Qiu et al., McKee et al., and Swartz respectively in order to make a perovskite structure with better performance.

5. Claims 82-87 rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer (5,556,463) in view of Wasa et al. (2002/0076875) further in view of Lee et al. (202/0179000) further in view of Kizilyalli et al. (6,320,238) further in view of Qiu et al. (6,419, 849) further in view of Fukui (6,362,558) further in view of Swartz et al. (5,198,269).

Regarding Claims 82-87, Guenzer discloses bismuth titanate as a template layer for growth of crystallographically oriented silicon where a method of forming a crystallographically oriented silicon layer over a glassy layer of silicon dioxide. A templating layer of a layered perovskite is deposited on the glassy layer under conditions favoring its crystallographic growth with its long c-axis perpendicular to the film. The silicon is then grown over the templating layer

Art Unit: 2826

under conditions usually favoring monocrystalline growth. Guenzer fails to disclose the required method of making a single crystal silicon in the required manner, method of making perovskite structure, oxide interface structure, compound structure, and the piezoelectric with thickness structure. However, Wasa et al. disclose the method of making single crystal silicon structure. Furthermore, Lee et al. disclose the method of making perovskite structure. Kizilyalli and Qiu combination disclose the required oxide interface structure. Fukui discloses the required piezoelectric structure. Finally, Swartz discloses the required compound semiconductor structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the required method for monocrystalline silicon in the required manner, monocrystalline perovskite structure, required oxide interface, required compound/piezoelectric structure in Guenzer as taught by, Wasa et al., Lee et al., Kizilyalli et al., Qiu et al., Fukui., and Swartz respectively in order to make a perovskite structure with better performance.

6. Claims 88-90 rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer (5,556,463) in view of Wasa et al. (2002/0076875) further in view of Lee et al. (202/0179000) further in view of Kizilyalli et al. (6,320,238) further in view of Qiu et al. (6,419, 849) further in view of Miyashita et al. (6,140,746) further in view of Swartz et al. (5,198,269).

Regarding Claims 88-90, Guenzer discloses bismuth titanate as a template layer for growth of crystallographically oriented silicon where a method of forming a crystallographically oriented silicon layer over a glassy layer of silicon dioxide. A templating layer of a layered perovskite is deposited on the glassy layer under conditions favoring its crystallographic growth with its long c-axis perpendicular to the film. The silicon is then grown over the templating layer



Art Unit: 2826

under conditions usually favoring monocrystalline growth. Guenzer fails to disclose the required method of making a single crystal silicon in the required manner, method of making perovskite structure, oxide interface structure, compound structure, and the piezoelectric with thickness structure. However, Wasa et al. disclose the method of making single crystal silicon structure. Furthermore, Lee et al. disclose the method of making perovskite structure. Kizilyalli and Qiu combination disclose the required oxide interface structure. Miyashita et al. disclose the required piezoelectric structure. Finally, Swartz discloses the required compound semiconductor structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the required method for monocrystalline silicon in the required manner, monocrystalline perovskite structure, required oxide interface, required compound/piezoelectric structure in Guenzer as taught by, Wasa et al., Lee et al., Kizilyalli et al., Qiu et al., Miyashita et al., and Swartz respectively in order to make a perovskite structure with better performance.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (703) 305-3868. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Art Unit: 2826

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

FE

May 18, 2003

NATHAN J. FLYNN  
SUPERVISORY PATENT EXAMINER  
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